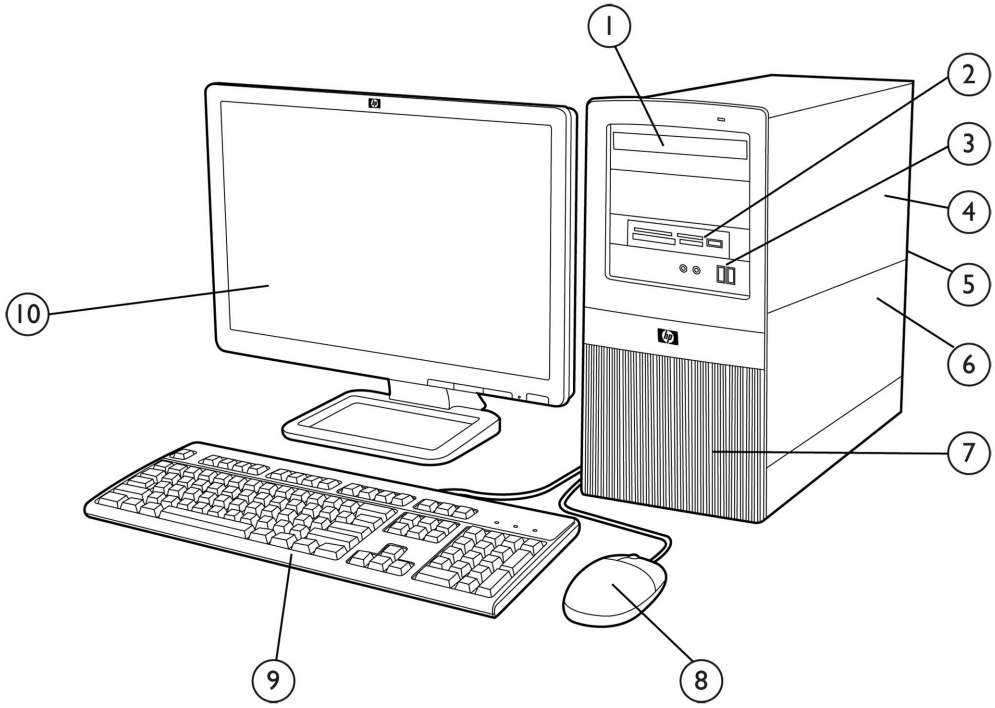
*Overview*

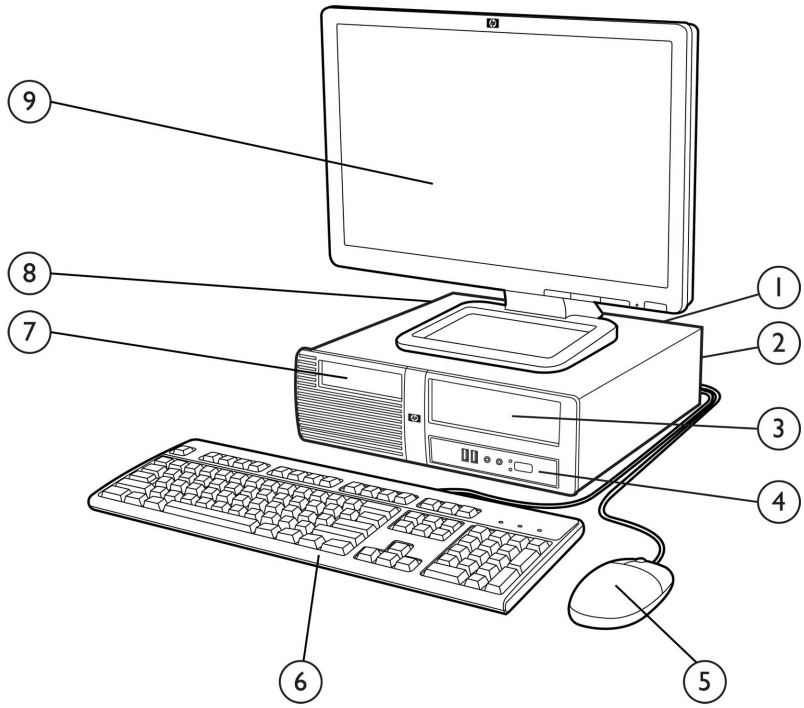
Microtower




1. (2) external 5.25" drive bays for optional optical drives
   (1) external 3.5" drive bay for optional media reader o
3. Front I/O includes: (2) USB 2.0 ports, dedicated headphone output and microphone jack
4. Power Supply
5 Rear I/O includes: 4) USB 2.0 ports, RJ-45 network interface, DVI-D and VGA video interfaces, microphone jack, audio in/out jacks, (3) surround sound outputs, digital SPDIF out
6. (3) PCIe x1 slots, (1) PCIe x16 slot
7. (2) internal 3.5" hard drive bays
8. PS/2 Scroll Mouse
9. HP Standard Keyboard
10. Monitor (sold separately)

*Overview*

Small Form Factor




1. (2) PCI 2.3 slots, (1) PCIe x1 slot, (1) PCIe x16 slot
2. Rear I/O includes: (6) USB 2.0 ports, serial port, PS/2 mouse and keyboard ports, RJ-45 network interface, DVI-D and VGA video interfaces, microphone jack, audio in/out jacks
3. (1) external 5.25" drive bay for optional optical drive; (1) internal 3.5" hard drive bay
4. Front I/O includes: (2) USB 2.0 ports, dedicated headphone output, and microphone jack
5. PS/2 Scroll Mouse
6. HP Standard Keyboard
7. (1) external 3.5" drive bay for optional media reader or Pocket Media drive
8. Power supply
9. Monitor (sold separately)

## At A Glance

- Support for Intel® Core™ 2 Duo and Core™ 2 Quad processors, Intel Pentium® processors, Intel Celeron® processors
- Genuine Windows 7 versions, Genuine Windows Vista versions, Genuine Windows XP Professional available through downgrade rights from Windows 7 Professional, SuSE Linux Enterprise Desktop 11, or FreeDOS
- Intel G43 Express Chipset
- Intel I/O Controller Hub 10 (ICH10)
- Intel Graphics Media Accelerator X4500HD with DX10 support
- PCI Express I/O bus
- Serial ATA controller
- Realtek 8111DL Gigabit Ethernet Controller
- Choice of hard drives and optical drives
- DDR3 SDRAM system memory
- Protected by HP Services. Terms and conditions vary by country. Certain restrictions and exclusions apply.

*Standard Features and Configurable Components (availability may vary by country)*

| | |
|---|---|
| Processor and Speed<br>One of the following | Intel Celeron Processors:<br>Intel Celeron 440 Processor (2.0-GHz, 512-KB L2 cache, 800-MHz FSB)<br>Intel Celeron 450 Processor (2.2-GHz, 512-KB L2 cache, 800-MHz FSB)<br>Intel Celeron Dual-Core Processors<br>Intel Celeron E1500 Processor (2.2-GHz, 512K L2 cache, 800-MHz FSB)<br>Intel Celeron E3200 Processor (2.4-GHz, 1-MB L2 cache, 800-MHz FSB)<br>Intel Celeron E3300 Processor (2.5-GHz, 1-MB L2 cache, 800-MHz FSB)<br>Intel Pentium Dual-Core Processors:<br>Intel Pentium E5300 Processor (2.6-GHz, 2-MB L2 cache, 800-MHz FSB)<br>Intel Pentium E5400 Processor (2.7-GHz, 2-MB L2 cache, 800-MHz FSB)<br>Intel Pentium E6300 Processor (2.8-GHz, 2-MB L2 cache, 1066-MHz FSB)<br>Intel Pentium E6500 Processor (2.93-GHz, 2-MB L2 cache, 1066-MHz FSB)<br>Intel Core 2 Duo Processors:<br>Intel Core 2 Duo E7500 Processor (2.93-GHz, 3 MB L2 cache, 1066-MHz FSB)<br>Intel Core 2 Duo E7600 Processor (3.06-GHz, 3 MB L2 cache, 1066-MHz FSB)<br>Intel Core 2 Duo E8400 Processor (3.0-GHz, 6 MB L2 cache, 1333-MHz FSB)<br>Intel Core 2 Duo E8500 Processor (3.16-GHz, 6-MB L2 cache, 1333-MHz FSB)<br>Intel Core 2 Duo E8600 Processor (3.33-GHz, 6 MB L2 cache, 1333-MHz FSB)<br>Intel Core 2 Quad Processors:<br>Intel Core 2 Quad Q8300 Processor (2.5-GHz, 4 MB L2 cache, 1333-MHz FSB)<br>Intel Core 2 Quad Q8400 Processor (2.66-GHz, 4 MB L2 cache, 1333-MHz FSB)<br>Intel Core 2 Quad Q9400 Processor (2.66-GHz, 6 MB L2 cache, 1333-MHz FSB)<br>Intel Core 2 Quad Q9550 Processor (2.83-GHz, 12 MB L2 cache, 1333-MHz FSB)<br>Intel Core 2 Quad Q9650 Processor (3.0-GHz, 12 MB L2 cache, 1333-MHz FSB)<br>NOTE: Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. |

*Standard Features and Configurable Components (availability may vary by country)*

**Operating Systems and Application Software** (availability varies by region)

- Genuine Windows 7 Professional Edition (32-bit)[2]
- Genuine Windows 7 Professional Edition (64-bit)[2]
- Genuine Windows XP Professional available through downgrade rights from Windows 7 Professional [2,3]
- Genuine Windows 7 Home Premium Edition (32-bit or 64-bit)[2]
- Genuine Windows 7 Home Basic Edition (32-bit)[2]
- Genuine Windows 7 Starter2 (available 2010)
- Genuine Windows Vista Business (32-bit)[1]
- Genuine Windows Vista Home Basic (32-bit)[1]
- SuSE Linux Enterprise Desktop 11
- FreeDOS

[1] Certain Windows Vista product features require advanced or additional hardware. See www.microsoft.com/windowsvista/getready/hardwarereqs.mspx and www.microsoft.com/windowsvista/getready/capable.mspx for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: www.windowsvista.com/upgradeadvisor.

[2] System may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details.

[3] Windows 7 Professional disk may be included for future upgrade if desired. To qualify for this downgrade an end user must be a business (including governmental or educational institutions) and is expected to order at least 25 customer systems with the same custom image.

2007 Microsoft Office Ready PC
Microsoft Office 2007 Basic
Microsoft Office 2007 Small Business
Microsoft Office 2007 Professional
HP Recovery Manager

Mozilla Firefox for HP Virtual Solutions
Hard Disk Partitioning
Roxio Easy Media Creator 10**
Core WinDVD 8**
Core WinDVD BD for Blu-Ray**
McAfee Total Protection Anti-Virus***
PDF Complete
2008 Intel Matrix Storage Manager
HP Power Manager v2.0 (Edison)
Credential Manager
HP Total Care Advisor
USB Port Disable
Sun Java Runtime Environment
Welcome Center SMB Offers

** Supporting software available with certain optical drive configurations
*** 60 day trial period for McAfee Total Protection for Small Business software. Internet access required to receive updates. First update included. Subscription required for updates thereafter.

*Standard Features and Configurable Components (availability may vary by country)*

| | |
|---|---|
| Hard Drives | 160-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm)<br>250-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm)<br>320-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm)<br>500-GB Serial ATA 3.0-Gb/s Hard Drive (7200 rpm) |
| System Memory | 1-GB DDR3 Synch DRAM PC3-10600 (1066/1333-MHz) Non-ECC (1 x 1GB)<br>2-GB DDR3 Synch DRAM PC3-10600 (1066/1333-MHz) Non-ECC (2 x 1GB)<br>2-GB DDR3 Synch DRAM PC3-10600 (1066/1333-MHz) Non-ECC (1 x 2GB)<br>3-GB DDR3 Synch DRAM PC3-10600 (1066/1333-MHz) Non-ECC (3 x 1GB)<br>3-GB DDR3 Synch DRAM PC3-10600 (1066/1333-MHz) Non-ECC (1 x 1GB + 1 x 2GB)<br>4-GB DDR3 Synch DRAM PC3-10600 (1066/1333-MHz) Non-ECC (4 x 1GB)<br>4-GB DDR3 Synch DRAM PC3-10600 (1066/1333-MHz) Non-ECC (2 x 2GB)<br>4-GB DDR3 Synch DRAM PC3-10600 (1066/1333-MHz) Non-ECC (1 x 4GB)<br>8-GB DDR3 Synch DRAM PC3-10600 (1066/1333-MHz) Non-ECC (4 x 2GB)<br>8-GB DDR3 Synch DRAM PC3-10600 (1066/1333-MHz) Non-ECC (2 x 4GB)<br>NOTE: With some processors, memory runs at maximum speed of 1066 MHz. For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system. |
| Storage – One or more of the following (see Storage section below) | Media Reader<br>HP 22-in-1 Media Card Reader<br>Optical Drives (Serial ATA)<br>SATA DVD-ROM Drive<br>SATA SuperMulti LightScribe DVD Writer<br>HP SATA Blu-ray Writer |
| Input Devices | Keyboard – One of the following<br>HP USB PS/2 Washable Keyboard<br>HP USB Standard Keyboard<br>HP USB Mini Keyboard<br>HP USB Smartcard Keyboard<br>Mouse – One of the following<br>USB 2-Button Optical Scroll Mouse<br>USB 2-Button Laser Mouse |
| Audio | Realtek ALC888 High Definition audio codec<br>HP USB Thin Powered Speakers |

*Standard Features and Configurable Components (availability may vary by country)*

| | |
|---|---|
| Communication | Realtek 8111DL GbE Ethernet Controller<br>Intel Gigabit CT Desktop NIC<br>LSI PCIe x1 56K International SoftModem<br>HP Wireless 802.11 b/g/n PCIe x1 Card |
| Graphics | Intel Graphics Media Accelerator X4500HD<br>ATI Radeon HD 4350 (512MB) FH PCIe x16 Card (for MT only)<br>ATI Radeon HD 4350 (512MB) LP PCIe x16 Card (for SFF only)<br>ATI Radeon HD 4550 (256MB) DH PCIe x16 Graphics Card<br>ATI Radeon HD 4650 1GB Dual Head PCIe x16 Card (FH for MT only)<br>NVidia GeForce G210 512MB ATX PCIe x16 (for MT only)<br>NVidia GeForce G210 512MB LP PCIe x16 (for SFF only<br>NVidia GeForce GT230 1.5GB PCIe x16 Card<br>DMS-59 To Dual DVI Y-Cable Adapter |
| Miscellaneous | HP Chassis Security Kit<br>Belkin USB to Serial Port Adapter |

*System Details*

**Base Unit**

- MT: Micro ATX Microtower chassis, including power supply and front bezel; five (5) drive bays and four expansion slots
- SFF: Micro ATX Small Form Factor chassis, including power supply and front bezel; three (3) drive bays and four expansion slots
- Active type heatsink
- 92 x 92 x 25 mm chassis fan for Microtower chassis
- No chassis fan for Small Form Factor chassis
- System board with Intel G43 Express chipset, Intel I/O Controller Hub 10R (ICH10), Realtek RTL8111DL Ethernet controller, Intel GMA X4500HD graphics, and Realtek audio, (3) PCI Express x1 slots, (1) PCI Express x16 slot, (4) DDR3 DIMM memory slots, (4) Serial ATA data connectors, (8) USB Ports (see USB support below), (1)VGA, (1)DVI-D port, (1) digital SPDIF out
- Power cord

**Slots**

| | |
|---|---|
| PCI | Three (3) full-height PCI Express x1 slots on PCA<br>One (1) full-height PCI Express x16 slot on PCA (for graphic cards) |
| Memory Expansion | Four (4) DDR3 SDRAM DIMM slots (8 GB maximum memory support) |

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

**Bays**

| | |
|---|---|
| Internal | MT: Two (2) 3.5-inch<br>SFF: One (1) 3.5-inch |
| External | MT: Two (2) 5.25-inch; One (1) 3.5-inch<br>SFF: One (1) 5.25-inch; One (1) 3.5-inch |

**USB Support**

EHCI high-speed USB 2.0 controller

Two (2) front ports; Four (4) rear ports
Eight (8) internal ports on system board:

- 2 for front ports
- 2 for media card reader
- 4 reserved for future upgrade

**Interfaces** (Legacy)

One (1) analog VGA video port
One (1) DVI-D video port
One (1) line in; one (1) line out; one (1) microphone in
Three (3) Surround sound outputs
One (1) Digital SPDIF Out
One (1) RJ45 network port

*System Details*

| | | |
|---|---|---|
| Weight & Dimensions (MT) | Chassis Dimensions (H x W x D) | 15.14 x 7.27 x 16.36 in<br>385 x 185 x 416 mm |
| | Packaged Dimensions (D x L x W) | 19.63 x 24.13 x 10.56 in<br>498.6 x 613 x 268.2 mm |
| | System Weight | 16.7 lb (7.58 kg) |
| | Shipping Weight | 24.77 lb (11.24 kg) |
| Weight & Dimensions (SFF) | Chassis Dimensions (H x W x D) | 3.98 x 13.35 x 15.24 in<br>101 x 339 x 387 mm |
| | Packaged Dimensions (D x L x W) | 23.38 x 19.68 x 9.0 in<br>593.8 x 500.0 x 228.6 mm |
| | System Weight | 14.9 lb (6.76 kg) |
| | Shipping Weight | 22.77 lb (10.33 kg) |
| Technology and Features | Memory Type | PC3-10600 DDR3 SDRAM (1066/1333MHz) non-ECC<br>Up to 8 GB system memory standard |
| | NOTE: Memory runs at maximum system supported speed of 1066 MHz, or at 800 MHz when processor has 800-MHz FSB. For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system. | |
| | Hard Drive Interfaces Supported | Serial ATA, RAID and NCQ support |
| Chassis | Front Panel | Power button<br>Power On LED<br>HDD Activity LED |
| | Cooling Solutions Supported | Power Supply Fan (variable speed)<br>Active heatsink (variable speed)<br>Chassis fan (variable speed) (MT only) |
| | Slots Supported | Four (4) full-height expansion slots |
| | Front I/O | MT: Two (2) USB 2.0 ports, Headphone, Mic<br>SFF: Two (2) USB 2.0 ports, Headphone, Mic |
| | Rear I/O | Standard Micro ATX I/O connectors, including four (4) USB 2.0 ports |
| | Drive Bays (MT) | Two (2) 5.25-inch (13.335 cm) half height external<br>One (1) 3.5-inch (8.89 cm) half height external<br>Two (2) 3.5-inch half height internal |
| | Drive Bays (SFF) | One (1) 5.25-inch half height external<br>One (1) 3.5-inch half height external<br>One (1) 3.5-inch half height internal |
| | Security | Padlock loop<br>Kensington Lock Support |
| | Power Supply | MT: 300W PFC<br>SFF: 250W PFC |

## Unit Environment and Operating Conditions

### General Unit Operating Guidelines

- Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range.
- Leave a 4 in (10.2 cm) clearance on all vented sides of the computer to permit the required airflow.
- Never restrict airflow into the computer by blocking any vents or air intakes.
- Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.
- Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow.
- If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.

| | | |
|---|---|---|
| Temperature Range (MT) | Operating | 41° to 95° F (5° to 35° C) |
| | Non-operating | –22° to 149° F (–30° to 65° C) |
| Relative Humidity (MT) | Operating | 10% to 90% (non-condensing at ambient) |
| | Non-operating | 5% to 95% (non-condensing at ambient) |
| Maximum Altitude (MT) (unpressurized) | Operating | 10,000 ft (3048 m) |
| | Non-operating | 30,000 ft (9144 m) |
| Temperature Range (SFF) | Operating | 50° to 95° F (10° to 35° C) |
| | Non-operating | –22° to 140° F (–30° to 60° C) |
| Relative Humidity (SFF) | Operating | 10% to 90% (non-condensing at ambient) |
| | Non-operating | 10% to 95% (non-condensing at ambient) |
| Maximum Altitude (SFF) (unpressurized) | Operating | 10,000 ft (3048 m) |
| | Non-operating | 30,000 ft (9144 m) |

NOTE: Operating temperature is de-rated 1.0 deg C per 1000 ft (300 m) to 7500 ft (2286 m) for MT and 10000 ft (3000m) for SFF above sea level, no direct sustained sunlight. Maximum rate of change is 7.5 deg C/Hr for MT and 10 deg C/Hr for SFF. The upper limit may be limited by the type and number of options installed.

*System Details*

| | | |
|---|---|---|
| System Board | Processor | Socket T; LGA775 industry standard Micro ATX form factor |
| | | Support single Intel Core 2 Duo and Core 2 Quad, Pentium dual-core, or Celeron processors |
| | Chipset | Intel G43 Express<br>Intel I/O Controller Hub 10 (ICH10) |
| | Memory | DDR3 SDRAM |
| | | 4 x DIMM slots |
| | Integrated Graphics | Intel Graphics Media Accelerator (GMA) X4500HD |
| | Audio | Realtek ALC662 HD Audio compatible codec with two channel audio 3D audio compliant with AC'97 rev. 2.3 |
| | LOM | Realtek RTL8111DL |
| | Storage | Four Serial ATA interfaces |
| | Expansion Slots | 3 x PCI Express x1 slots |
| | | 1 x PCI Express x16 slot |
| | BIOS | SPI FLASH ROM |
| | Industrial Standard | PCIe compliant |
| | | USB 2.0 |
| | Rear I/O Ports | 4 x USB 2.0 ports |
| | | 1 x RJ-45 10/100/1000 port |
| | | 1 x DVI-D video port |
| | | 1 x DB 15-pin analog VGA port |
| | | 6 x audio ports |
| | On Board I/O Interfaces | 1 x ATX power connector |
| | | 1 x +12V power connector |
| | | 1 x Front panel connector, Switch, LED (ON/Flash/OFF) |
| | | 2 x Fan headers for CPU, chassis, with voltage/fan speed control |
| | | 1 x header (1 – 2x5) to support 2 USB 2.0 ports at front side |
| | | 1 x header (1 – 2x5) to support USB Card Media Reader<br>4 x header (4 – 1x5) to support additional USB devices |
| | | 1 x header to support 2 front (Headphone/Mic) audio ports |
| | Board Size | Micro-ATX, PCB Size: 9.6 x 9.6 in (24.38 x 24.38 cm) |
| | | 4-layer PCB with green color |
| | Additional Features | Bootable without keyboard, mouse or monitor |
| | | Keyboard/mouse/USB wake up |
| | | Support S3, S4 and S5 |
| | | ACPI status |
| | | Hardware monitor capability |
| | | CPU fan speed control |
| | | One button reset/recovery* |
| | | *Reset function will be set for China/Hong Kong/Korea; Recovery function will be set for the other regions |

*System Details*

| | |
|---|---|
| Network Interface | Realtek 8111DL GbE Ethernet Controller<br>Intel Gigabit CT Desktop NIC |
| Wireless | MT: Wireless 802.11b/g/n PCIe Card (full height bracket)<br>SFF: Wireless 802.11b/g/n PCIe Card (low profile bracket) |
| Modem | LSI PCIe x1 56K International SoftModem |

Power Supply

| | Microtower | Small Form Factor |
|---|---|---|
| Model | 300W PFC | 250W PFC |
| Standard Efficiency | N/A | N/A |
| Energy Efficient | N/A | N/A |
| Operating Voltage Range | 90 to 132VAC, or<br>180 to 264VAC | 90 to 132VAC, or<br>180 to 264VAC |
| Rated Voltage Range | 100 to 127VAC, or<br>200 to 240VAC | 100 to 127VAC, or<br>200 to 240VAC |
| Rated Line Frequency | 50/60 Hz | 50/60 Hz |
| Operating Line Frequency Range | 47 – 63 Hz | 47 – 63 Hz |
| Rated Input Current | 8A/4A | 8A/4A |
| 115V/230V Line switch | Yes | Yes |
| Rated Input Current with Energy Efficient* Power Supply | N/A | 8A/4A |
| Current Leakage (NFPA 99) | <3.5mA | <3.5mA |
| System Heat Dissipation | 250W:<br>48.5 W or 165.482 BTU/hr. (For 115V/60Hz)<br>48.2 W or 164.4584 BTU/hr. (For 30V/50Hz)<br>300W:<br>50.4W or 171.9648 BTU/hr. (For115V/60Hz)<br>50.3W or 171.6236 BTU/hr.(For 230V/50Hz) | 52.8W or 180.1536 BTU/hr. (For 115V/60Hz)<br>53.3W or 181.8596 BTU/hr. (For 230V/50Hz) |
| System Heat Dissipation with Energy Efficient* Power Supply | N/A | N/A |
| Power Supply Fan | 80mm variable speed | 80mm variable speed |
| FEMP Standby Power Compliant (<2W in S5 - Power Off)* | 250W:<br>0.45W (For 115V/60Hz)<br>0.53W (For 230V/50Hz)<br>300W:<br>0.65W (For 115V/60Hz)<br>0.71W (For 230V/50Hz) | 0.42W (For 115V/60Hz)<br>0.47W (For 230V/50Hz) |

*System Details*

| | | |
|---|---|---|
| Power Consumption in ES Mode - Suspend to RAM (S3) (Instantly Available PC) | <3W | <3W |
| High voltage immunity | up to 410V/s | N/A |
| China Telecom YD/T 993-2006 spec | Yes | N/A |

**System Environmental Specs**

- Values are subject to change without notification and are for reference only.
- Performance of system, options, and ancillary equipment will vary depending on the system configuration.
- Levels presented do not account for non-HP/Compaq installed hardware.

| | | |
|---|---|---|
| Ambient Air Temperature | Operating | MT: Operating 41° to 95°F (5 to 35°C) (Test 0 to 104°F (40°C));<br>SFF: 50° to 95°F (10° to 35°C) at sea level with an altitude de-rating of 1.0°C per every 1000 ft (300 m) above sea level to a maximum of 10000 ft (3048 m), no direct sustained sunlight. Maximum rate of change is 50°F/Hr (10°C/Hr). The upper limit may be limited by the type and number of options installed. |
| | Storage | MT: Storage: 90% RH @ 60°C for 12 hours (Non-condensing)<br>SFF: –22° to 140°F (–30° to 60°C). |
| Humidity | Operating | MT: 10% to 90% relative humidity (Rh), 35°C non-condensing<br>SFF: 10% to 90% relative humidity (Rh), 35°C maximum wet bulb temperature, non-condensing |
| | Storage | MT: 90% relative humidity (Rh), 60°C for 12 hours, non-condensing<br>SFF: 90% relative humidity (Rh), 60°C for 12 hours, non-condensing |
| Altitude | Operating | MT: 0 to 10,000 feet (0 to 3048 meters) – This value may be limited by the type and number of options installed.<br>SFF: 0 to 10,000 feet (0 to 3048 meters) – This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 1,000 ft/min (304.8 m/min). |
| | Non-Operating | MT: 0 to 30,000 feet (0 to 9,144 meters)<br>SFF: 0 to 30,000 feet (0 to 9,144 meters) – Maximum allowable altitude change rate is 1200 ft/min (365.76 m/min). |
| Shock | Listed are the levels of vibration the product can withstand with No damage being incurred. The values represent a flat random vibration input acceleration profile across the given frequency range. | |
| | Non-Operating | 35G's (Half-sine Shock)<br>30G's (Trapezoidal Shock) |

*System Details*

**Vibration**

Listed are the levels of shock the product can withstand with No damage being incurred. The values represent peak input acceleration during an 2~3 ms half-sine shock pulse, 11 ms trapezoidal shock pulse.

| | |
|---|---|
| Operating | MT: Random vibration at 5Hz@0.00025$G^2$/Hz, 10Hz@0.01$G^2$/Hz, 100Hz@0.01$G^2$/Hz, 300Hz@0.00001$G^2$/Hz<br>5Hz to 300Hz, (0.25G's nominal).<br>SFF: Random vibration at 5Hz@0.00025$G^2$/Hz, 10Hz@0.01$G^2$/Hz, 100Hz@0.01$G^2$/Hz, 300Hz@0.00001$G^2$/Hz<br>5Hz to 300Hz, (0.25G's nominal). |
| Non-Operating | MT: ~2.09Grms (5-500Hz), Non-Operational<br>SFF: Random vibration at 0.008$G^2$/Hz,<br>10Hz to 500Hz, (2 Grms nominal). |

**Acoustic Noise**

Listed are the declared A-WEIGHTED SOUND POWER LEVELS (LWAd) and declared average desktop seated operator position A-WEIGHTED SOUND PRESSURE LEVELS (LpAm) when the product is operating in a 73.4°F (23°C) ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).

| | |
|---|---|
| MT: IDLE (Fixed disk drive spinning) | LWAd = 4.3 Bels,<br>Desktop Average LpAm = 32 dBA |
| SFF: IDLE (Fixed disk drive spinning) | LWAd = 4.3 Bels,<br>Desktop Average LpAm = 32 dBA |
| MT: FIXED DISK (Random write) | LWAd = 4.4 Bels,<br>Desktop Average LpAm = 33 dBA |
| SFF: FIXED DISK (Random write) | LWAd = 4.4 Bels,<br>Desktop Average LpAm = 33dBA |
| MT: DVD-ROM (Sequential Reads) | LWAd = 5.5 Bels,<br>Deskside Average LpAm = 44 dBA |
| SFF: DVD-ROM (Sequential Reads) | LWAd = 5.2 Bels,<br>Deskside Average LpAm = 42dBA |

**Service and Support**

On-site Warranty[Note 1]: 1-1-0, 1-1-1, 3-3-0 limited warranty delivers on-site, next business-day[Note 2] service for parts and labor and includes free telephone support[Note 3] 24 x 7. Global coverage[Note 2] ensures that any product purchased in one country and transferred to another non-restricted country will remain fully covered under the original warranty and service offering. One-year onsite and labor are not available in all countries.

NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.

NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.

NOTE 3: Technical telephone support applies only to HP-configured Compaq and third-party HP-qualified hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.

*After-Market Options (availability may vary by country)*

| | | |
|---|---|---|
| Communications | NICs | |
| | Intel Gigabit CT Desktop NIC | FH969AA |
| | Wireless LAN | |
| | HP Wireless 802.11/b/g/n PCIe x1 | FH971AA |
| | Modems | |
| | LSI PCIe x1 56K International SoftModem | FH970AA |
| Hard Disk Drives | HP 500-GB SATA 3.0-Gb/s Hard Drive | PV943A |
| | HP 320-GB SATA 3.0-Gb/s Hard Drive | FH963AA |
| | HP 250-GB SATA 3.0-Gb/s Hard Drive | PY278AA |
| | HP 160-GB SATA 3.0-Gb/s Hard Drive | PY277AA |
| Removable Storage Devices | HP 22-in-1 Media Card Reader | AR941AA |
| Input Devices | Keyboards | |
| | HP USB JB Standard Keyboard | DT528A |
| | HP USB PS2 Washable Keyboard | VF097AA |
| | HP USB Mini Keyboard | AS601AA |
| | Mice | |
| | HP USB 2-Button Optical Scroll Mouse | DC172B |
| | HP USB 2-Button Laser Mouse | GW405AA |
| I/O Adapter | Belkin Serial to USB adapter | EM449AA |
| Memory | HP 1GB PC3-10600 (DDR3-1333) DIMM | AT023AA |
| | HP 2GB PC3-10600 (DDR3-1333) DIMM | AT024AA |
| Audio | HP Thin USB Powered Speakers | KK912AA |
| Graphics | ATI Radeon HD 4550 (256MB DH) PCIe x16 Graphics Card | AT042AA |
| | ATI Radeon HD 4650 DP (1GB) PCIe x16 Graphics Card | VN566AA |
| | NVIDIA GeForce G210 HDMI (512MB) SH PCIe x16 Graphics Card | VN565AA |
| | NVIDIA GeForce GT230 1.5GB PCIe x16 Graphics Card | VH697AA |
| | HP DMS59 DVI Dual-head Connector Cable | DL139A |
| | HP DVI to DVI Cable | DC198A |

*After-Market Options (availability may vary by country)*

| | | |
|---|---|---|
| Optical Drives | HP 16X/48X SATA DVD-ROM Drive BLK | AR629AA |
| | HP 16X SATA SuperMulti LightScribe DVD Drive BLK | AR630AA |
| | HP 16X SATA Blu-ray Writer BLK | AR482AA |
| Security | HP Business PC Security Lock Kit | PV606AA |
| | HP/Kensington MicroSaver Security Cable Lock | PC766A |
| | HP Chassis (dc) Security Kit | AR639AA |

*Memory*

### DDR SYNCH DRAM NON-ECC MEMORY

The Intel G43 Express chipset supports non-ECC DDR3 memory up to PC3-10600 (1333 MHz). However, the chipset runs this memory at a maximum clock rate of 1066 MHz, or at 800 MHz when processor has 800-MHz FSB. Memory upgrades are accomplished by adding single or multiple DIMMs of the same or varied sizes. This chart does not represent all possible memory configurations.

CAUTION: You must shut down the computer **and disconnect the power cord** before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged in to an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board.

**HP recommends dual-channel symmetric configurations for maximum performance.**
For best performance, add the same amount of total memory to each channel and do not mix speeds. For dual-channel symmetric performance, the total amount of memory in each channel must be equal. If speeds are mixed, speed will default to the slowest DIMM.

### STANDARD MEMORY

1-GB, 2-GB, 4-GB DDR3 SYNCH DRAM

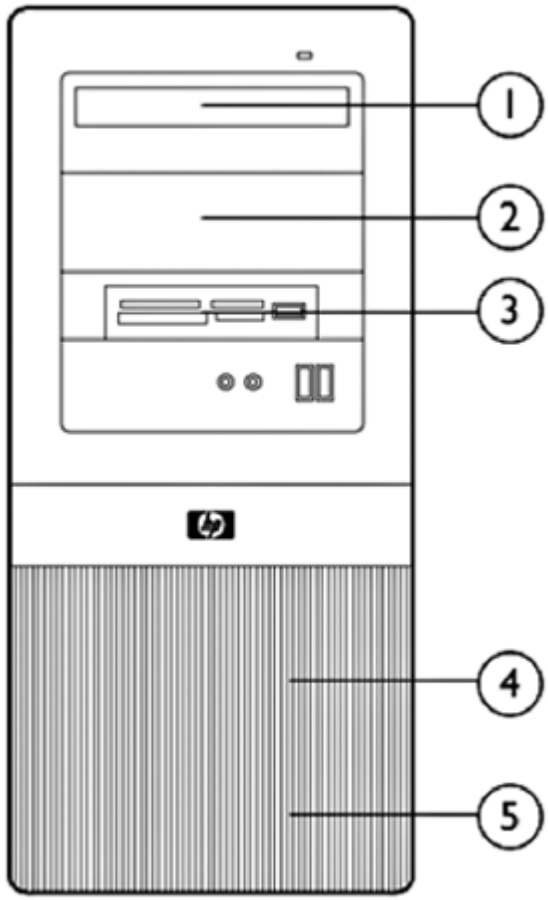
### OPTIONAL MEMORY UPGRADES

Supports up to 8-GB of DDR3 SYNCH DRAM. Not all memory configurations possible are represented below.

NOTE: : For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

| DIMM Size | Slot 1 (Blue) | Slot 2 (Black) | Slot 3 (Blue) | Slot 4 (Black) |
|---|---|---|---|---|
| 1-GB | 1-GB | | | |
| 2-GB (dual-channel symmetric) | 1-GB | | 1-GB | |
| 2-GB | 2-GB | | | |
| 3-GB | 1-GB | | 2-GB | |
| 3-GB | 1-GB | 1-GB | 1-GB | |
| 4-GB (dual-channel symmetric) | 1-GB | 1-GB | 1-GB | 1-GB |
| 4-GB (dual-channel symmetric) | 2-GB | | 2-GB | |
| 8-GB (dual-channel symmetric) | 2-GB | 2-GB | 2-GB | 2-GB |

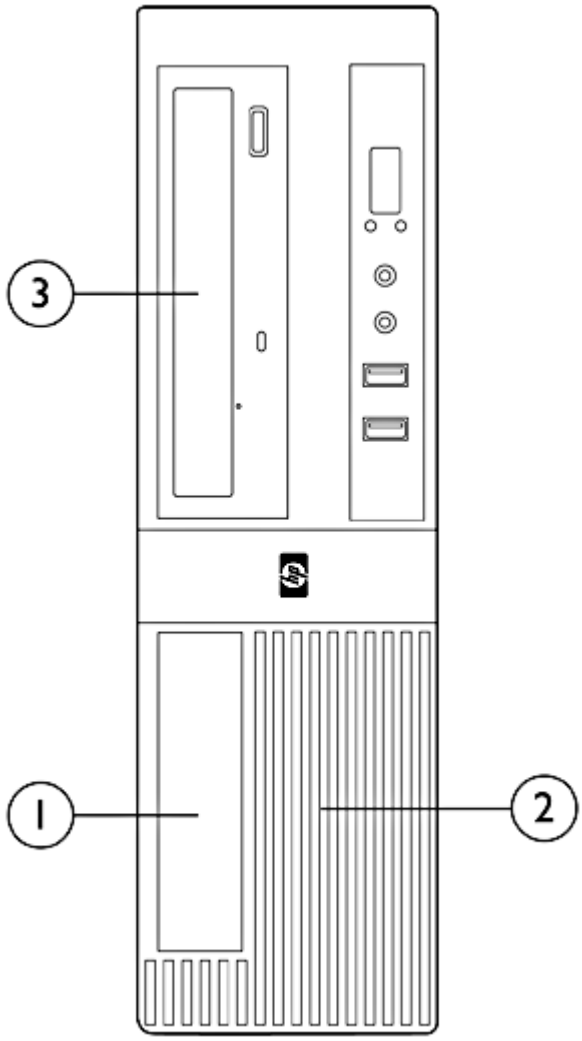
*Storage*




HP Pro 3010 Microtower Business PC

| | Maximum Quantity Supported | Position Supported | Controller |
|---|---|---|---|
| **Drive Support** | | | |
| Media Reader | 1 | 3 | Internal USB 2.0 port |
| DVD-ROM Drives | 2 | 1, 2 | SATA |
| SuperMulti LightScribe Drives | 2 | 1, 2 | SATA |
| Blu-Ray JB Writer | 2 | 1, 2 | SATA |
| 3.5″ Serial ATA Hard Drives | 2 | 4, 5 | SATA |

*Storage*




HP Pro 3010 Small Form Factor Business PC

| | Maximum Quantity Supported | Position Supported | Controller |
|---|---|---|---|
| **Drive Support** | | | |
| Media Reader | 1 | 1 | Internal USB 2.0 port |
| DVD-ROM Drives | 1 | 3 | SATA |
| SuperMulti LightScribe Drives | 1 | 3 | SATA |
| Blu-Ray JB Writer | 1 | 3 | SATA |
| 3.5" Serial ATA Hard Drives | 1 | 2 | SATA |

| | | | |
|---|---|---|---|
| Integrated Realtek ALC888S Audio | Type | Integrated | 2-channel |
| | HD Audio compatible codec | Yes | |
| | Sampling | Supports 48/96 KHz | |
| | Audio Jacks | Mic-In | |
| | | Line-In | |
| | | Line-Out / Headphone Out<br>Center/Sub<br>Surround Side<br>Surround Rear | |
| | Power Support | Digital: 3.3V | |
| | | Analog: 5V | |
| | Other | Meets performance requirements for audio on PC99/2001 systems<br>High-performance DACs with 97dB SNR(A-Weighting)<br>ADCs with 90dB NR(A-Weighting) | |

| | | |
|---|---|---|
| Integrated Realtek 8111DL-VB-GR GbE Ethernet Controller | Connector | RJ45 |
| | Controller | Realtek 8111DL-VB-GR Gigabit Ethernet Controller |
| | Memory | Transmit/Receive on-chip buffer support |
| | Data rates supported | 2.5GHz data rate with X1 link width. |
| | Compliance | IEEE 802.1P, 802.1Q, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control |
| | Bus architecture | PCI Express 1.1 |
| | Data transfer mode | DMA |
| | Power requirement (LOM) | 1000mbps (TxRx) max.568mW<br>1000mbps (TxRx) idle.498mW<br>100mbps (TxRx) max.274mW<br>1000mbps (TxRx) idle.224mW<br>10mbps (TxRx) max.330mW<br>10mbps (TxRx) idle.155mW<br>D3 hot with Link (10M) 155 mW<br>D3 hot without Link 76 mW<br>D3 cold with Link (10M) 109 mW<br>D3 cold without Link with WoL 30 mW<br>D3 cold without Link with WoL 3 mW |
| | Network transfer rate | 10/100/1000 Mbps over CAT.5<br>10 Mbps over CAT.3 |
| | Dimensions | 7mm x 7mm |
| | Power Management | ACPI rev 2.0, PCI PM rev 1.1, ASPM L0s/L1 |
| | Connector | RJ45 |

*Technical Specifications*

| | | |
|---|---|---|
| Intel Gigabit CT Desktop NIC | Connector | RJ-45 |
| | Controller | Intel WG82574L Gigabit Ethernet Controller |
| | Memory | Integrated Dual 48K configurable transmit receive FIFO Buffers |
| | Data rates supported | 10/100/1000 Mbps |
| | Compliance | IEEE 802.1P, 802,1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control |
| | Bus architecture | PCI-E 1.0a |
| | Data path width | X1, 250 MB/s, Bi-directional interface |
| | Data transfer mode | Bus-master DMA |
| | Hardware certifications | FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union |
| | Power requirement | Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T |
| | Boot ROM support | Yes |
| | Network transfer rate | 10BASE-T (half-duplex) 10 Mbps |
| | | 10BASE-T (full-duplex) 20 Mbps |
| | | 100BASE-TX (half-duplex) 100 Mbps |
| | | 100BASE-TX (full-duplex) 200 Mbps |
| | | 1000BASE-T (full-duplex) 2000 Mbps (actual rate limited by PCI Bus) |
| | Environmental | Operating temperature 32° to 131°F (0° to 55° C) |
| | | Operating humidity 85% at 131° F (55° C) |
| | Dimensions | 4.75 x 2.25 x 0.8 in (12.1 x 5.7 x 2.0 cm) |
| | Management capabilities | WOL, PXE, DMI, WFM 2.0 |

| | | |
|---|---|---|
| LSI PCIe x1 56K International SoftModem | Data Transmission | Technology speeds: 56,000 Kbps maximum downstream data, controllerless<br>NOTE: 56 Kbps technology refers to download speeds only and requires compatible modems at server sites. Other conditions may limit modem speed. FCC limitations allow a maximum of 53 Kbps during download transmissions. |
| | Data Speeds | (Upload only) 33,600/31,200/28,800/26,400/21,600/19,200/16,800/14,400/12,000/9,600/7,200/4,800/2,400/1,200/300 |
| | Data Standards | ITU-T V.90, ITU-T, ITU-T V.34, V.44, V.42, V.42bis21, V.32bis, Bell 212A, and Bell 103 |
| | Fax Speeds | 14,400/12,000/9,600/7,200/4,800/2,400/1,200/300 b/s |
| | Fax Mode Capabilities | ITU-T T.31 class 1 FAX, V. 17, V.29, V.27ter, and V.21 Channel 2 |
| | Error Correction and Data Compression | V.44, 42bis, V.42 and MNP2-5 |
| | Power Management | PCI Bus Power Management Interface Specification (PCI-PM) Revision 1.2, Appendix A. D0, D3hot, and D3cold. Wake on Ring state when in D3cold. If the power management event (PME) feature is enabled in D3cold, a modem can wake the system via WAKE# (WAKEN) or beacon. Meets PCI Express 1.1 standard. |
| | Upgradeability | Driver upgradeable for future enhancements |
| | Video | ITU-T V.80 video ready interface |

| | |
|---|---|
| Other | TIA/EIA 602 standard AT command set |
| | Integrated DTE interface with speeds of up to 115.2 Kbps, parallel 16550a UART-compatible interface |
| | Optional ring wakeup signal |
| Operating Temperature | 32° to 158° F (0° to 70° C) |
| Operating Humidity | 20% to 90%, non-condensing |
| Power | Requires a 3.3-V auxiliary power rail on PCI express bus |
| | Uses only one PCI express load (i.e., one grant/request pair), one shared IRQ, one electrical load |
| Chipset | LSI SV92EX - Integrated PCI interface with 3.3-V tolerant buffers and CardBus support |
| Dimensions (L X H) | Complies with PCI express low profile specifications-6.7 x 2.3 in (17.0 x 5.8 cm) and supports high- and low-profile brackets |
| Connection | Single RJ-11 connector |
| Other Features | Digital line protection, call progress monitoring via on-board piezo device, support for high profile and low profile brackets, PnP ID support |
| Safety | UL recognized to UL 1950, 3rd edition (U.S. and Canada); IEC 950 (TUV, NEMKO, DEMKO, SEMKO); CE Mark, EC 950 (TUV, NEMKO, DEMKO, SEMKO, CE mark |
| EMC | FCC Part 15, IC ES003, EN 55022, 3rd edition, EN 55024, annex A, EN 61000-4-6, EN 61000-4-8 |
| Telecom | FCC Part 68, IC-CS-03 (Canada); Worldwide PTT approvals<br>Not available in Korea or the Republic of South Africa. |
| Other | The SV92EX device is packaged in a 32-pin micro leadless chip carrier (MLCC). The SV92EX is fully compliant with the PCI Express revision 1.1 specification. WHQL approved; ASPM compliant. |

| | |
|---|---|
| HP Wireless 802.11 b/g/n PCIe Card | NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13112_div/13112_div.html (Worldwide) |
| DMS-59 to Dual DVI Cable | NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12845_div/12845_div.html (Worldwide) |

| | | |
|---|---|---|
| Integrated Intel Graphics Media Accelerator X4500HD | 3D/2D Controller | Microsoft DirectX® 10 based with support for Pixel Shader 3.0 |
| | VGA Controller | Integrated |
| | DVI | Integrated |
| | Bus Type | PCI Express™ x16 |
| | RAMDAC | Integrated, 350 MHz |
| | Graphics Engine Clock | 667 MHz |
| | Memory | Graphics memory is shared with system memory. Graphics memory usage varies depending on the amount of system memory installed, BIOS settings, operating system, and system load. 32 MB is pre-allocated for graphics use at system boot time. Additional memory can be allocated at boot time by the BIOS for PAVP (Protected Audio Video Playback) support for playback of protected video content. For Vista, use of PAVP heavy mode pre-allocates an additional 96MB.<br><br>Additional memory is allocated for graphics as needed using Intel's Dynamic Video Memory Technology (DVMT), to provide an optimal balance between graphics and system memory use. |

Windows XP Memory Usage:

| Total System Memory (GB) | Total Graphics memory (MB) | Pre-Allocated (MB) | DVMT (MB) |
|---|---|---|---|
| 0.5 | 128 | 32 | 96 |
| | 256 | 32 | 224 |
| 1 | 512 | 32 | 480 |
| 1.5 | 768 | 32 | 736 |
| =>2.0 | 1024 | 32 | 992 |

Windows Vista Memory Usage:
Support for DVMT 5.0. The graphics driver will determine DVMT memory. DVMT memory = Total GFX memory – Pre-allocated size and fixed memory = Pre-allocated memory.

| | |
|---|---|
| HW Video Decode | Full Hardware Accelerated decode for MPEG2 encrypted video; support for PAVP Lite (default) and Heavy ( or Paranoid) modes. Full H.264 and VC1 Variable Length Decode Acceleration and Intel Clear Video Technology Support. |
| Maximum Color Depth | 32 bits/pixel |
| Maximum Vertical Refresh Rate | 85 Hz at up to 1920x1440, 75 Hz at 2048x1536. Varies with mode and configuration. See table below. |
| Multi-display Support | Dual Independent monitor support facilitated via one VGA port and one DVI integrated on the back plane of the system board and presented as part of the rear I/O set of interfaces. |
| Graphics/Video API Support | Microsoft DirectX® 10, OpenGL® 1.5 (OpenGL® 2.0 available in a driver update) |

Resolutions Supported

NOTE: Other resolutions may be available but are not recommended as the may not have been tested and qualified by HP.

*Technical Specifications*

| | Maximum Refresh Rate (Hz) | |
|---|---|---|
| Resolution | Analog Connection | Digital Connection |
| 640x480 | 85 | 60 |
| 800x600 | 85 | 60 |
| 1024x768 | 85 | 60 |
| 1280x720 | 85 | 60 |
| 1280x1024 | 85 | 60 |
| 1440x900 | 75 | 60 |
| 1600x1200 | 85 | 60 |
| 1680x1050 | 75 | 60 |
| 1920x1080 | 85 | 60-R |
| 1920x1200 | 85 | 60-R |
| 1920x1440 | 85 | N/A |
| 2048x1536 | 75 | N/A |

NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections

**NVIDIA G210 (512MB) PCIe x16 Card**

**Form Factor**: ATX Full Height

**Display max resolution**: Analog VGA: 2048x1536x32bpp @ 75Hz &1920x1440x32bpp @ 75Hz
DVI: 2560x1600x32bpp @ 75Hz
HDMI: 1920x1200x32bpp @ 100Hz

**Input/Output connectors**: Dual-Link DVI-I/VGA/HDMI

**Board configuration**

| Specification | Description |
|---|---|
| Graphics Chip | NVIDIA D10M1 |
| Core clock | 600 MHz |
| Memory clock | 500 MHz |
| Frame buffer | 512 MB DDR2, 192bit |

**Compliance standards**

EMC Emissions:

- FCC Part 15, Subpart B - Unintentional Radiators, Class B Computing Devices for Home & Office Use
- CISPR22: 1997/EN 55022:1998 - Class B - Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment
- Canadian Standard ICES-003 is equivalent to CISPR22
- Japanese VCCI
- Taiwanese Standard BSMI
- Australian C-Tick
- Korean (KCC)

EMC Immunity:
CISPR 24:1997/EN 55024:1998 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement.

**Core power**: 21 W (Max board power)

NVIDIA G210 (512 MB) PCIe x16 Graphics Controller display resolutions and refresh rates

NOTE:

*Technical Specifications*

- Other resolutions may be available but are not recommended as they may not have been tested and qualified by HP
- All standard VGA text/graphics modes are supported in addition to table below.
- All modes not highlighted are selectable Windows® desktop modes. Highlighted modes should not be selectable as Windows® desktop modes (they are for DirectX™)
- All modes up to and including 1600x1200 must support the video overlay at all refresh rates.

| Analog Resolution | Depth(bpp) | CRT Maximum Refresh Rate (Hz) | VGA AND DVI-A (ANALOG) | DVI-I (DIGITAL) | HDMI |
|---|---|---|---|---|---|
| 640 x 480 | 16, 32 | 60, 72, 75, 85, 90, 100, 120, 160 | X | X | X |
| 800 x 600 | 16, 32 | 48, 56, 60, 70, 72, 75, 85, 90, 100, 120, 160 | X | X | X |
| 848x480 | 16, 32 | 60, 88 | X | X | X |
| 1024 x 768 | 16, 32 | 46, 60, 70, 72, 75, 85, 90, 100, 120 | X | X | X |
| 1152x864 | 16, 32 | 43, 47, 60, 70, 75, 80, 85, 100 | X | X | X |
| 1280x720 | 16, 32 | 60, 70, 75, 80, 85, 90, 100 | X | X | X |
| 1280x768 | 16, 32 | 60, 70, 75, 80, 85, 90, 100 | X | X | X |
| 1280 x 1024 | 16, 32 | 43, 47, 60, 70, 74, 75, 85, 90, 100 | X | X | X |
| 1600 x 1200 | 16, 32 | 52, 58, 60, 66, 70, 72, 75, 76, 85 | X | X | X |
| 1768x1344 | 16, 32 | 60, 75 | X | X | X |
| 1800x1440 | 16, 32 | 60, 65, 75 | X | X | X |
| 1856x1392 | 16, 32 | 60, 75 | X | X | X |
| 1920 x 1080 | 16, 32 | 60, 70, 75, 80, 85, 90, 100 | X | X | X |
| 1920 x 1200 | 16, 32 | 60, 72, 75, 76 80, 85, 90, 100 | X | X | X |
| 1920 x 1440 | 16, 32 | 60, 75 | X | X | NA |
| 2048 x 1536 | 16, 32 | 60, 66, 70, 75 | X | X | NA |
| 2560 x 1600 | 16, 32 | 60, 75 | NA | X | NA |

**NVIDIA GeForce GT230 1.5GB PCIe x16 Graphics Card**

| | | |
|---|---|---|
| Form Factor | ATX Full Height | |
| Display max resolution | Analog VGA: 2560x1600x32bpp @ 60Hz &1920x1440x32bpp @ 60Hz<br>DVI: 2560x1600x32bpp @ 60Hz<br>HDMI: 2560x1600x32bpp @ 60Hz | |
| Input/Output connectors | Dual-Link DVI-I/VGA/HDMI | |
| Board configuration | Specification | Description |
| | Graphics Chip | NVIDIA D10P1 |
| | Core clock | 500 MHz |
| | Memory clock | 500 MHz |
| | Frame buffer | 1.5 GB DDR2, 192bit |

Compliance standards

EMC Emissions:

- FCC Part 15, Subpart B - Unintentional Radiators, Class B Computing Devices for Home & Office Use
- CISPR22: 1997/EN 55022:1998 - Class B - Limits and methods of measurement of radio disturbance characteristics of Information

Technology Equipment
- Canadian Standard ICES-003 is equivalent to CISPR22
- Japanese VCCI
- Taiwanese Standard BSMI
- Australian C-Tick
- Korean (KCC)

EMC Immunity:
CISPR 24:1997/EN 55024:1998 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement.

Core power 65 W (Max board power)

NVIDIA GT230 (1.5 GB) PCIe x16 Graphics Controller display resolutions and refresh rates

NOTE:

- Other resolutions may be available but are not recommended as they may not have been tested and qualified by HP
- All standard VGA text/graphics modes are supported in addition to table below.
- All modes not highlighted are selectable Windows® desktop modes. Highlighted modes should not be selectable as Windows® desktop modes (they are for DirectX™)
- All modes up to and including 1600x1200 must support the video overlay at all refresh rates.

| Analog Resolution | Depth(bpp) | CRT Maximum Refresh Rate (Hz) - VGA AND DVI-A (ANALOG) | CRT Maximum Refresh Rate (Hz) - DVI-I (DIGITAL) | CRT Maximum Refresh Rate (Hz) - HDMI |
|---|---|---|---|---|
| 800 x 600 | 8, 16, 32 | 72, 75 | 59, 60, 72, 75 | NA |
| 1024 x 768 | 8, 16, 32 | 70, 75 | 59, 60, 70, 75 | NA |
| 1280x720 | 8, 16, 32 | 50, 59, 60 | 50, 59, 60, 75 | 50, 59, 60 |
| 1280 x 1024 | 8, 16, 32 | 60, 70, 75 | 59, 60, 75 | NA |
| 1400x 900 | 8, 16, 32 | NA | 59, 60 | NA |
| 1600 x 1200 | 8, 16, 32 | 60 | 60 | NA |
| 1920 x 1080 | 8, 16, 32 | 59, 60 | 59, 59, 60 | 50, 59, 60 |
| 1920 x 1200 | 8, 16, 32 | 59, 60 | 59, 60 | 59, 60 |
| 1920 x 1440 | 8, 16, 32 | 60 | 60 | 60 |
| 2048 x 1536 | 8, 16, 32 | 60 | 60 | 60 |
| 2560 x 1600 | 8, 16, 32 | 60 | 60 | 60 |

ATI Radeon HD 4350 HDMI (512MB) SH PCIe x16 Graphics Card

| | | |
|---|---|---|
| Input/Output connectors | Dual-link DVI-I/VGA/HDMI | |
| Display max resolution | Analog VGA: 1920x1200x32bpp @ 60Hz<br>DVI: 1920x1200x32bpp @ 60Hz<br>HDMI: 1920x1200x32bpp @ 60Hz | |
| Display support | Integrated 400 MHz RAMDAC | |
| Bus type | PCI Express (x16 lanes) | |
| Board configuration | Specification | Description |
| | Graphics Chip | RV710D2 |
| | Core clock | 600 MHz |
| | Memory clock | 500 MHz |
| | Frame buffer | 512 MB DDR2, 64 bit wide |

| | |
|---|---|
| Languages supported | 24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish |
| Core power | 23 W |
| Compliance standards | EMC Emissions: |

a. FCC Part 15, Subpart B - Unintentional Radiators, Class B Computing Devices for Home & Office Use
b. CISPR22: 1997/EN 55022:1998 - Class B - Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment
c. Canadian Standard ICES-003 is equivalent to CISPR22
d. Japanese VCCI
e. Taiwanese Standard BSMI
f. Australian C-Tick
g. Korean (KCC)

EMC Immunity:
CISPR 24:1997/EN 55024:1998 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement.

ATI HD4350 (512 MB) PCIe x16 Graphics Controller display resolutions and refresh rates

NOTE:

- Other resolutions may be available but are not recommended as they may not have been tested and qualified by HP
- All standard VGA text/graphics modes are supported in addition to table below.
- All modes not highlighted are selectable Windows® desktop modes. Highlighted modes should not be selectable as Windows® desktop modes (they are for DirectX™)

All modes up to and including 1600x1200 must support the video overlay at all refresh rates.

| Analog Resolution | Depth(bpp) | CRT Maximum Refresh Rate (Hz) - VGA AND DVI-A (ANALOG) | CRT Maximum Refresh Rate (Hz) - DVI-I (DIGITAL) | CRT Maximum Refresh Rate (Hz) - HDMI |
|---|---|---|---|---|
| 800 x 600 | 16, 32 | 60, 75 | 60, 75 | 60, 75 |
| 1024 x 768 | 16, 32 | 60, 75 | 60, 75 | 60, 75 |
| 1152x648 | 16, 32 | NA | NA | 59, 60 |
| 1152x864 | 16, 32 | NA | 60, 75 | 59, 60 |
| 1280x720 | 16, 32 | NA | 60 | 50, 59, 60 |
| 1280x768 | 16, 32 | 75 | 60, 75 | 60, 75 |
| 1280x960 | 16, 32 | 60 | 60 | 60 |
| 1280 x 1024 | 16, 32 | 60, 75 | 60, 75 | 60, 75 |
| 1440x900 | 16, 32 | 60 | 60 | 60 |
| 1600 x 1200 | 16, 32 | 60 | 60 | 60 |
| 1680x1050 | 16, 32 | 60 | 60 | 60 |
| 1920 x 1080 | 16, 32 | NA | 59, 60 | 50, 59, 60 |
| 1920 x 1200 | 16, 32 | 59, 60 | 59, 60 | 59, 60 |

ATI Radeon HD Input/Output DMS-59

*Technical Specifications*

**4550 (256MB DH) PCIe x16 Graphics Card**

| | |
|---|---|
| **connectors** | S-video connector |
| **Board display options** | Supports two displays via included DMS-59 to dual VGA cable or 2 DVI monitors via optional DMS-59 to dual DVI cable kit part number: DL139A. 4-pin mini-DIN S-video connector for TV output |
| **Display max resolution** | 1900 x 1200 digital, 2048 x 1536 analog |
| **Display support** | Integrated 400 MHz RAMDAC |
| **Bus type** | PCI Express (x16 lanes) |
| **Maximum vertical refresh rate** | 85 Hz |

**Board configuration**

| Specification | Description |
|---|---|
| Graphics Chip | RV710 |
| Core clock | 600 MHz |
| Memory clock | 800 MHz |
| Frame buffer | 256 MB DDR2, 64 bit wide |

**Languages supported**

24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish

**Operating systems support**

Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows XP Professional or Windows XP Home 32*.
* Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.
Linux x86 and x86_64 distributions using XFree86 or X.Org**.
** Linux drivers are available from ATI's website and may be available in a Linux distribution. Refer to the Open Source and Linux from HP website: http://www.hp.com/wwsolutions/linux/products/clients/ for support information

**Core power**

21 W

**Option kit contents**

- ATI Radeon HD 4550 DH PCIe x16 Graphics Card with full height bracket attached;
- DMS 59 to dual VGA Y cable;
- Software CD with graphics drivers;
- Low profile bracket to convert the card for using in a low profile chassis;
- Warranty documentation;

**Compliance standards**

EMC Emissions:

a. FCC Part 15, Subpart B - Unintentional Radiators, Class B Computing Devices for Home & Office Use
b. CISPR22: 1997/EN 55022:1998 - Class B - Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment
c. Canadian Standard ICES-003 is equivalent to CISPR22
d. Japanese VCCI
e. Taiwanese Standard BSMI
f. Australian C-Tick
g. Korean (MIC)

EMC Immunity:
CISPR 24:1997/EN 55024:1998 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement.

ATI Radeon HD 4550 DH PCIe x16 Graphics Card display resolutions and refresh rates

NOTE: Other resolutions may be available but are not recommended as they may not have been tested and qualified by HP.

| Resolution | Maximum Refresh Rate (Hz) | |
|---|---|---|
| | Analog Connection | Digital Connection |
| 640x480 | 85 | 60 |
| 800x600 | 85 | 60 |
| 1024x768 | 85 | 60 |
| 1280x720 | 85 | 60 |
| 1280x1024 | 85 | 60 |
| 1440x900 | 75 | 60 |
| 1600x1200 | 85 | 60 |
| 1680x1050 | 75 | 60 |
| 1920x1080 | 85 | 60-R |
| 1920x1200 | 85 | 60-R |
| 1920x1440 | 85 | N/A |
| 2048x1536 | 75 | N/A |
| 2560x1600 | N/A | N/A |

NOTE: 60-R denotes reduced blanking timings are used on single-link DVI connections and may be used with other digital connections.

**Languages supported**
24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish

**Operating systems support**
Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows XP Professional or Windows XP Home 32*.

* Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.

Linux x86 and x86_64 distributions using XFree86 or X.Org**.

** Linux drivers are available from ATI's website and may be available in a Linux distribution. Refer to the Open Source and Linux from HP website: http://www.hp.com/wwsolutions/linux/products/clients/ for support information.

**Core power**
21 W

**Option kit contents**
- ATI Radeon HD 4550 DH PCIe x16 Graphics Card with full height bracket attached
- DMS 59 to dual VGA Y cable
- Software CD with graphics drivers
- Low profile bracket to convert the card for using in a low profile chassis
- Warranty documentation

**Compliance standards**
EMC Emissions:

a) FCC Part 15, Subpart B - Unintentional Radiators, Class B Computing Devices for Home & Office Use
b) CISPR22: 1997/EN 55022:1998 – Class B – Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment
c) Canadian Standard ICES-003 is equivalent to CISPR22
d) Taiwanese Standard BSMI
e) Japanese VCCI
f) Australian C-Tick
g) Korean (KCC)

EMC Immunity:
CISPR 24:1997/EN 55024:1998 – Information Technology Equipment – Immunity Characteristics – Limits and Methods of Measurement.

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**ATI Radeon HD 4650 (1GB DH) PCIe Graphics Card**

| | |
|---|---|
| **Bus type** | PCI Express (x16 lanes) |
| **Maximum vertical refresh rate** | 85 Hz |
| **Display support** | Dual 400 MHz integrated RAMDACs |
| **Display max resolution** | 2560 x 1600 digital, 2048 x 1536 analog |
| **Board display options** | Supports two displays through any combination of two of the three output ports. |

**Board configuration**

| Specification | Description |
|---|---|
| Graphics Chip | RV730Pro |
| Core clock | 600MHz |
| Memory clock | 500 MHz |
| Frame buffer | 1 GB DDR2, 128 bit wide |

| | |
|---|---|
| **Maximum power** | 55 W |
| **Languages supported** | 24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish |
| **Operating systems support** | Windows Vista Home Basic 32*, FreeDOS<br>* Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.<br>Linux x86 and x86_64 distributions using XFree86 or X.Org**<br>** Linux drivers are available from ATI's website and may be available in a Linux distribution. Refer to the Open Source and Linux from HP website: http://www.hp.com/wwsolutions/linux/products/clients/ for support information. |
| **Core power** | 55 W |
| **Compliance standards** | EMC Emissions:<br>a) CISPR22: 1997/EN 55022:1998 - Class B - Limits and methods of measurement of radio disturbance characteristics of Information Technology |

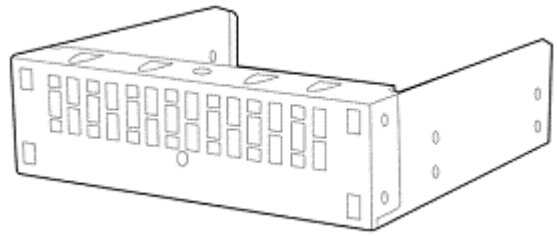
| | |
|---|---|
| | Equipment<br><br>EMC Immunity:<br>CISPR 24:1997/EN 55024:1998 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement. |
| Board display options | Supports two displays through any combination of two of the three output ports. |
| Board configuration | Specification: Description<br>Graphics Chip: RV730Pro<br>Core clock: 600MHz<br>Memory clock: 500 MHz<br>Frame buffer: 1 GB DDR2, 128 bit wide |
| Maximum power | 55 W |
| Languages supported | 24 languages: English, Arabic, Chinese Simplified, Chinese Traditional, Czechoslovakian, Danish, Dutch, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Thai, Turkish |
| Operating systems support | Windows Vista Home Basic 32*, FreeDOS<br><br>* Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.<br><br>Linux x86 and x86_64 distributions using XFree86 or X.Org**<br><br>** Linux drivers are available from ATI's website and may be available in a Linux distribution. Refer to the Open Source and Linux from HP website: http://www.hp.com/wwsolutions/linux/products/clients/ for support information. |
| Option kit contents | • ATI Radeon HD 4650 512MB PCIe x16 Graphics Card<br>• Software CD with graphics drivers<br>• Warranty documentation |
| Compliance standards | EMC Emissions:<br>a) CISPR22: 1997/EN 55022:1998 - Class B - Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment<br><br>EMC Immunity:<br>CISPR 24:1997/EN 55024:1998 - Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement. |

| | | |
|---|---|---|
| HP USB Standard Keyboard | | NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/11880_div/11880_div.html (Worldwide) |
| HP USB PS2 Washable Keyboard | | NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13395_div/13395_div.html (Worldwide) |
| HP USB Mini Keyboard | | NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13237_div/13237_div.html (Worldwide) |
| HP USB Smart Card Keyboard | | NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12346_div/12346_div.html (Worldwide) |
| HP USB 2-Button Laser Mouse | | NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12912_div/12912_div.html (Worldwide) |
| HP USB Optical Scroll Mouse | | NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/11356_div/11356_div.html (Worldwide) |
| Serial ATA 3.0-Gb/s Hard Drives (7200 rpm) | 160 GB<br>250 GB<br>320 GB<br>500 GB | NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12229_div/12229_div.html (Worldwide) |
| SATA DVD-ROM Drive | | NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12548_div/12548_div.html (Worldwide) |
| HP SATA SuperMulti LightScribe Drive | | NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12739_div/12739_div.html (Worldwide) |
| HP 16X SATA Blu-ray Writer | | NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13321_div/13321_div.html (Worldwide) |

*Technical Specifications*

**HP Chassis Security Kit**

Prevent access to or removal of internal components like memory, hard drive, and power supply, particularly designed for the education market.



Chassis Security Kit

**Key Benefits**

- Protect your investment and help keep the system up and running by:
- Safeguarding the memory and hard drive with a metal bay filler
- Securing the power supply with two screws
- Preventing cable disconnection
- Locking down the front bezel so that internal components cannot be removed

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**HP 22-in-1 Media Card Reader**

| | | |
|---|---|---|
| USB interface | USB 2.0 High-speed device via PCI card or pass -through via internal USB port of system board | |
| Advance protocol support | • Supports hardware ECC (Error Correction Code) function<br>• Supports hardware CRC (Cyclic Redundancy Check) function<br>• Supports MS 4-bit parallel transfer mode<br>• Supports MS-PRO 4-bit parallel transfer mode<br>• Supports SD 4-bit parallel transfer mode<br>• Supports high-speed 50 MHz SD 4-bit card (version 1.1)<br>• Support high-speed 52 MHz MMC 8-bit card (version 4.x) | |
| Supported media types | • Supports CompactFlash Card Type I (CF I), CompactFlash Card Type II (CF II), MicroDrive (MD)<br>• Supports 3.3V SmartMedia Card (SM), SmartMedia ROM (SM ROM), xD-Picture Card (xD)<br>• Supports Secure Digital Card (SD), Secure Digital ROM Card (SD ROM), miniSD, MultiMediaCard (MMC), Secure MultiMediaCard (Secure MMC), ROM Type MultiMediaCard (MMC ROM), Reduced Size MultiMediaCard (RS MMC), MultiMediaCard 4.0 (MMC Plus), Reduced Size MultiMediaCard 4.0 (MMC Mobile)<br>• Support Memory Stick (MS), Memory Stick ROM (MS ROM), MagicGate Memory Stick (MG), Memory Stick Select, Memory Stick Duo (MS Duo), Memory Stick PRO (MS-PRO), Memory Stick PRO Duo (MS PRO Duo) | |
| Mechanical | **Length** (3.5″) | 124.7 cm |
| | **Width** (3.5″) | 101.6 cm |
| | **Height** (3.5″) | 25.4 cm |
| | **Length** (5.25″) | 171.6 cm |
| | **Width** (5.25″) | 148.9 cm |
| | **Height** (5.25″) | 42.7 cm |
| Environmental | **Operational environmental extremes** | Test Parameters/Conditions – Power applied, unit operating on system ±5% nominal supply voltage.<br>10°C 10% R.H. = 24 hours<br>10°C 90% R.H. = 24 hours |

| | | |
|---|---|---|
| | | 20°C 90% R.H. = 24 hours<br>30°C 90% R.H. = 24 hours<br>40°C 90% R.H. = 24 hours<br>50°C 90% R.H. = 24 hours<br>50°C 10% R.H. = 24 hours |
| | Storage environmental extremes | Test Parameters/Conditions<br>60°C @ 80% R.H. for 96 hours<br>-30°C @ 20% R.H. for 48 hours<br>No power applied<br>Delta °C < 1.0°C/min<br>Delta % R.H. < 1.5% R.H./min |
| Approvals | | USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.2<br>FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUV-T |

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